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ABSTRACT

The inclusion of a geographical isolation factor in a state's distribution formula for foundation aid is a mechanism for providing additional revenue to small schools or school districts that, because of geographical location, cannot be consolidated into more efficient units. This paper presents a model geographical isolation factor that could be adjusted to meet the unique needs of any state with small, isolated schools. The proposed size criterion would extend eligibility for the geographical isolation classification to those elementary and secondary schools having fewer than 150 students in average daily membership. The proposed isolation criterion classifies a school as geographically isolated if it is 10 or more miles from the nearest school of the same level. Revenue entitlements to geographically isolated schools are to be determined on the basis of allowable teacher units, which are dependent on school enrollment and level. A conversion feature allows the entitlement to be computed by weighted pupil units in addition to teacher units. These pages were extracted from a larger work on geographical isolation. (Author/JM)

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DESCRIPTION OF A MODEL GEOGRAPHICAL ISOLATION FACTOR

An Excerpt From

ENACTMENT AND IMPACT OF
GEOGRAPHICAL ISOLATION FACTORS
IN PUBLIC SCHOOL REVENUE LEGISLATION
IN THREE SELECTED STATES

Doctoral Dissertation by

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Grand Forks, North Dakota

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The inclusion of a geographical isolation factor in a state's distribution formula for foundation aid is a mechanism for providing additional revenue to small schools or school districts which, because of geographical location, cannot be consolidated into more efficient units. The use of the geographical isolation factor does not force further consolidation of small schools but does recognize that schools which are small by local choice should raise the necessary revenue to fund the higher per-pupil costs related to such schools at the local level. On the other hand, those schools which do not have the option of further consolidation, within the practical limits of pupil transportation time, should receive additional revenue from state sources to meet those same high per-pupil costs.

A geographical isolation factor must contain two criteria for distinguishing isolated schools. One--the size criterion--identifies schools whose size mandates higher per-pupil costs if an acceptable educational program is to be offered to the students. The other criterion--the isolation criterion--identifies schools whose geographic location prevents consolidation into larger, and more efficient, educational units. This isolation criterion may use specific limits of distance or population density or may allow identification of isolated schools on an individual basis with a state board or agency employing any number of factors in its determination of isolation.

This paper presents a model geographical isolation factor that could be adjusted to meet the unique needs of any state with small, isolated schools. The following sections present the size criterion, the isolation criterion, and the revenue provisions for this model.

Size Criterion

The proposed size criterion would extend eligibility for the geographical isolation classification to those elementary and secondary schools which have fewer than 150 students in average daily membership (ADM) in either grades one through six or grades seven through twelve.

The size criterion is based upon the assumption that schools encounter significantly greater diseconomies of scale as the enrollment declines to less than twenty-five students per grade. This assumption is supported by the fact that this average pupil-teacher ratio of twenty-five to one would provide one teacher per grade in an elementary school and one teacher for each major subject area (English, mathematics, science, and social studies) plus two additional full-time teachers in a secondary school. When the total number of students in grades one through six or grades seven through twelve drops below 150, the school must operate either with lower and more inefficient pupil-teacher ratios or with combined-grade classrooms in the elementary and fewer subject-area specialists in the secondary grades.

The proposed size criterion appears to ignore the studies that have been done to calculate optimum and/or minimum size of schools. However, it does appear that those studies did not consider the practical limitations on school size which exist in many of the sparsely settled central and western states. If the size criterion were to reflect minimum school enrollments of one hundred or more per grade or optimum district enrollments of in the thousands, the majority of districts in these states would be eligible for consideration as geographically isolated.

This proposed size criterion is only a guide, though. In the actual development of legislation to authorize the use of a geographical isolation factor, studies should be made of the particular state's school systems. These studies should provide objective data to support the establishment of a size criterion which would best meet the needs of the individual state's schools.

Isolation Criterion

The isolation criterion of the proposed geographical isolation factor is based upon distance and student travel time to school. The basic criterion provides that a school may be eligible for geographical isolation classification if it is ten or more miles from the nearest

other public school of the same level (elementary or secondary). The distance is to be measured by the shortest route(s) using normally traveled all-weather roads. This criterion was developed from three assumptions: (1) students normally should not have to travel for more than one hour either to or from school, (2) school buses would normally average twenty to thirty miles per hour over the course of a bus route, and (3) students who lived farthest from a given neighboring school would have to travel up to twice the actual distance between the schools themselves in order to get to the neighboring school.

Distance was selected as the isolation criterion because it appears that it offers a more objective--and thus more defensible and more easily understood--measure of isolation than does state determination and that it more accurately identifies isolated schools than does population density. A single measure of distance might, however, lead to pressure to lower the required distance--especially from districts that are just under ten miles from the nearest other school. This problem could be alleviated by using twelve or more miles as the criterion for application of the geographical isolation factor's revenue provisions and providing for proportional revenue entitlements for small districts that are between eight and twelve miles from the nearest other school. This method of "phasing in" the isolation criterion is discussed more fully in the following section.

The isolation criterion also includes an appeal process through which districts which are not identified as isolated by the distance criterion may appeal to the state board of education or other state agency for consideration of unusual factors which cause the districts to be isolated. These other factors to be considered in the appeal process may include the condition of roads in the district, unusual weather conditions, unique distribution of students within a district, or the ability or inability of a neighboring school to receive the students from the school which is making the appeal. This appeal process probably should be restricted to districts that have truly unique circumstances and should not be allowed to be abused.

Revenue Provisions

The proposed geographical isolation factor provides revenue entitlements to identified geographically isolated schools according to the size or enrollment of the school. The revenue entitlements are to be included in a program of equalized state aid and are determined on the basis of allowable teacher units. The number of teacher units allowed is dependent upon the enrollment and the level of the school and may also be affected by the distance to the nearest other school. A conversion feature allows the entitlement to be computed by weighted pupil units in addition to teacher units. These details of the revenue provisions for geographically isolated schools are explained more fully below.

Figures 1 and 2 provide the bases for the revenue entitlements for geographically isolated schools. These two figures graphically show the number of teacher units allowed per enrollment for elementary and for secondary schools. Geographically isolated schools are allotted a minimum of one teacher unit for elementary schools or three teacher units for secondary schools. For this purpose, elementary schools are those which contain grades one through six and secondary schools are those which contain grades seven through twelve. The number of teacher units allowed increases with the enrollment of the school. The difference between teacher units allowed for isolated and non-isolated schools diminishes until--at the size criterion of 150 students in ADM--the number of teacher units allowed is the same for both geographically isolated and non-isolated schools. This is done for two purposes. First, the impact of the geographical isolation factor is "phased in" so that the revenue entitlement does not undergo a substantial increase at the size criterion. In other words, this prevents a situation in which a geographically isolated school with 145 students would lose substantial revenue entitlement if the enrollment of that school increased to, say, 153 and the school was

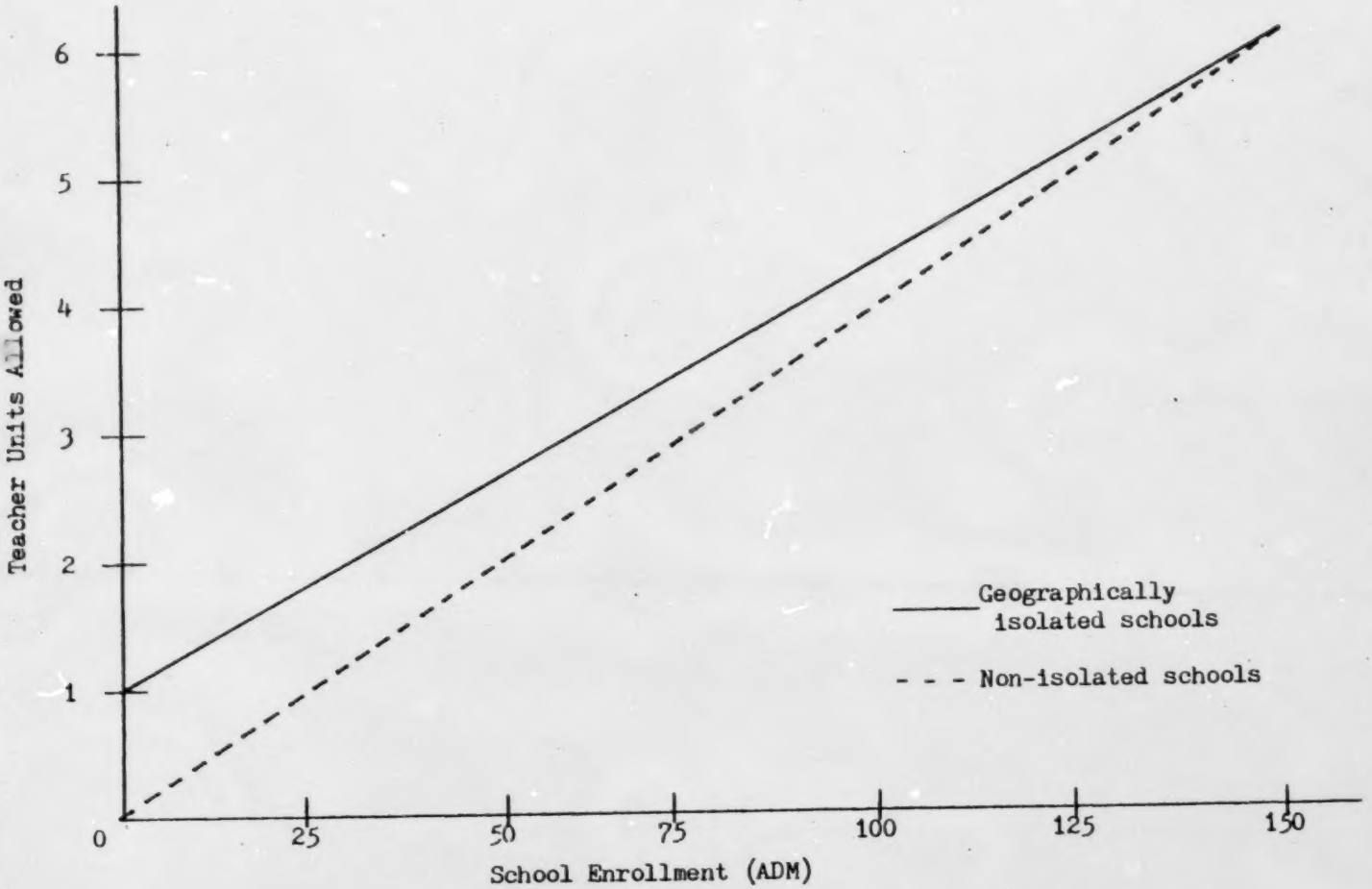

Fig. 1. Teacher units allowed for geographically isolated and for non-isolated elementary schools under the proposed geographical isolation factor.

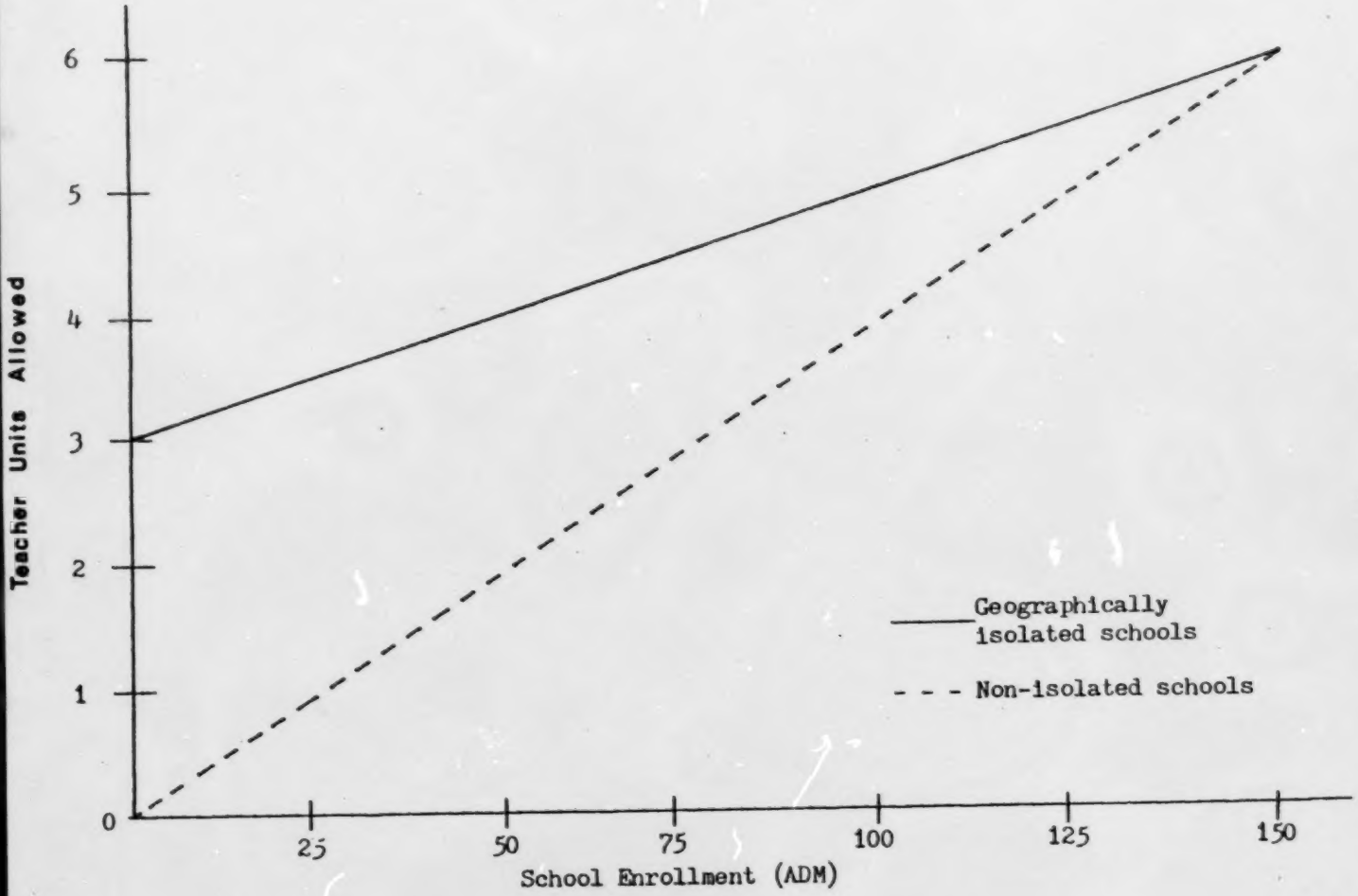

Fig. 2. Teacher units allowed for geographically isolated and for non-isolated secondary schools under the proposed geographical isolation factor.

no longer qualified for designation as geographically isolated. The diminishing impact of the geographical isolation factor lessens the difference between isolated and non-isolated schools as their enrollments increase to 150 students. Second, the allotments of teacher units shown in Figures 1 and 2 provide increasing proportional entitlements as enrollments decline. This allows the greatest impact of the factor to be applied to the smallest isolated schools and/or to those with declining enrollments so that those schools may continue to provide somewhat equal educational opportunities for their students. The revenue entitlements also provide increased impact for the smaller schools because of their inability to operate in an efficient manner. The allotments of teacher units shown in Figures 1 and 2 can be determined more accurately by the formulas shown in Figure 3. According to these formulas, an isolated elementary school

For geographically isolated elementary schools:

$$\text{Teacher Units Allowed} = 1 + \frac{\text{Enrollment (ADM)}}{30}$$

For geographically isolated secondary schools:

$$\text{Teacher Units Allowed} = 1 + \frac{\text{Enrollment (ADM)}}{50}$$

Fig. 3. Formulas for determining the allotment of teacher units for the proposed geographical isolation factor.

with an enrollment of thirty students in average daily membership (ADM) is allotted 2.0 teacher units while one with seventy-five students in ADM is allotted 3.5 teacher units (1 + 75/30). Secondary schools are allotted 3.6 teacher units for thirty students in ADM and 4.5 teacher units for seventy-five students in ADM (3 + 75/50). The teacher-unit distribution illustrated in Figures 1 and 2 and calculated by the formulas in Figure 3 may also be adjusted to allow a "phase-in" of the

isolation criterion (distance). This would provide full entitlement to schools located more than twelve miles from the nearest other school. Distance of eight-to-twelve miles would qualify isolated schools for partial entitlement while schools less than eight miles from the nearest other school would not qualify for any additional entitlement under the geographical isolation factor. Details of this "adjusted isolation criterion" are provided in an appendix.

The revenue provisions for the proposed geographical isolation factor have thus far been presented in terms of teacher units allowed or allotted. For use in a state aid program that is based on weighted pupil units, the teacher units can be converted to weighted pupil units by use of the two formulas shown in Figure 4. The first calculation

$$\text{Average Weighted Pupil Unit} = \frac{\text{Total Weighted Pupil Units}}{\text{Enrollment (ADM)}}$$

$$\text{Weighted Pupil Units Allowed} = \text{Teacher Units Allowed} \times 25 \times \text{District Average Weighted Pupil Unit}$$

Fig. 4. Formulas for the conversion of teacher units to weighted pupil units for the proposed geographical isolation factor.

is used to find the geographically isolated school's average weighted pupil unit. This is done by dividing the school's total weighted pupil units (as determined by normal state aid formulas) by the school enrollment in ADM. This average weighted pupil unit is then multiplied by both twenty-five and by the number of teacher units allowed. This second calculation determines the number of weighted pupil units allowed for the isolated school. For example, if an isolated secondary school had an enrollment of 100 ADM and a total of 140 weighted pupil units, the average weighted pupil unit would be 1.4. According to the second formula from Figure 3, the school would be allowed five teacher units. Multiplication with the three appropriate factors (1.4 x 25 x 5) yields a product of 175 weighted pupil units allowed. In other words, the

geographical isolation factor allows an additional entitlement of thirty-five weighted pupil units (175 - 140) for that school.

The actual number of dollars for the revenue entitlement is determined by multiplying either the teacher units allowed or the weighted pupil units allowed times the state foundation level. The foundation level--or guarantee--is established by legislative enactment and represents the per-teacher or per-pupil cost of the state's standard educational program. Three important points must be made regarding the foundation program in general. First, the foundation program should include equalization. In general terms, this means that a revenue entitlement is computed for each school district or school by multiplying the number of teacher or pupil units allowed times the state foundation level. The actual revenue received from the state is the remainder of the entitlement after the local fair share (property tax levy) and other designated revenue sources are deducted. The formula in Figure 5 shows the general equalization program. Second, the state foundation program should be based on a defined standard education program. This would establish the desired--and mandated--program attributes for all schools in

$$\text{District's State Aid} = \text{Revenue Entitlement} - \text{Local Fair Share} - \text{Other Designated Revenue Sources}$$

Fig. 5. General formula for calculating state aid under an equalized state foundation program.

the state. The standard program should establish the required course offerings, staffing needs, and other requirements. The standard program is important since it should provide a standard basis for determining the costs of education and should, with proper enforcement, ensure that all students in the state are provided with equitable educational opportunities. Third, the state foundation level or guarantee should reflect the actual costs of education within the state. Continuing study and adjustment of the foundation level should be required. Also, appropriate

weighting of teacher units or pupil units should reflect program cost differentials. For example, weightings could reflect the added costs of programs for special education and/or vocational education. Weightings could also reflect differences in costs between different grade levels or even between different school districts by including cost-of-living adjustments or staff experience and/or training adjustments. Whatever weightings are used in a state, they should reflect the actual costs of education within that state.

The final point regarding the revenue entitlement as well as the size and isolation criteria is that the specifics of the entire geographical isolation factor (number of miles, maximum enrollment, units of entitlement) should be established only after careful study of the individual state's needs and circumstances. A size criterion of 150 students in total ADM for grades one through six, an isolation criterion of ten miles to the nearest other school, and a specific program of revenue entitlements based on either teacher units or pupil units have been suggested. However, each of these is subject to adjustment by the state legislature after comprehensive study and planning.

The problems of small schools are readily apparent. The need now is for action to alleviate these problems. The guidelines for a model geographical isolation factor presented here should provide at least a part of the necessary foundation for such action.

APPENDIX

DISTANCE ADJUSTMENTS FOR THE REVENUE PROVISIONS OF THE MODEL GEOGRAPHICAL ISOLATION FACTOR

The model geographical isolation factor which has been described in this paper may be adjusted to "phase in" the impact of the factor according to the distance between the isolated school and the nearest other public school of the same level. As noted previously, this adjustment would eliminate a substantial difference in the revenue entitlements of two schools--one which just meets the distance or isolation criterion and the other which is just under the distance set by the isolation criterion. For example, under the basic model presented in the main body of this paper, a school which had less than 150 students in ADM (in grades one through six or grades seven through twelve) and which was 10.1 miles from the nearest other school would receive additional revenue entitlement because of geographical isolation. Anotherschool which had an identical enrollment but which was 9.9 miles from the nearest other school would receive no additional entitlement. The purpose of this appendix is to describe a mechanism by which the impact or additional revenue entitlement allowed for geographical isolation may be adjusted according to the distance between an isolated school and the nearest other school of the same level.

Figures 6 and 7 provide a graphic conceptualization of the distance adjustment. It will be noted that the model has been changed in that only schools which are more than twelve miles from the nearest other school can qualify for the full revenue entitlement of the factor. Small schools which are between eight and twelve miles from the nearest other school qualify for a partial entitlement, the amount of which is dependent on the actual distance. As was the case with the original model, the difference between the revenue entitlements decrease until all schools--regardless of distance--receive the same entitlement for enrollments of 150 or more.

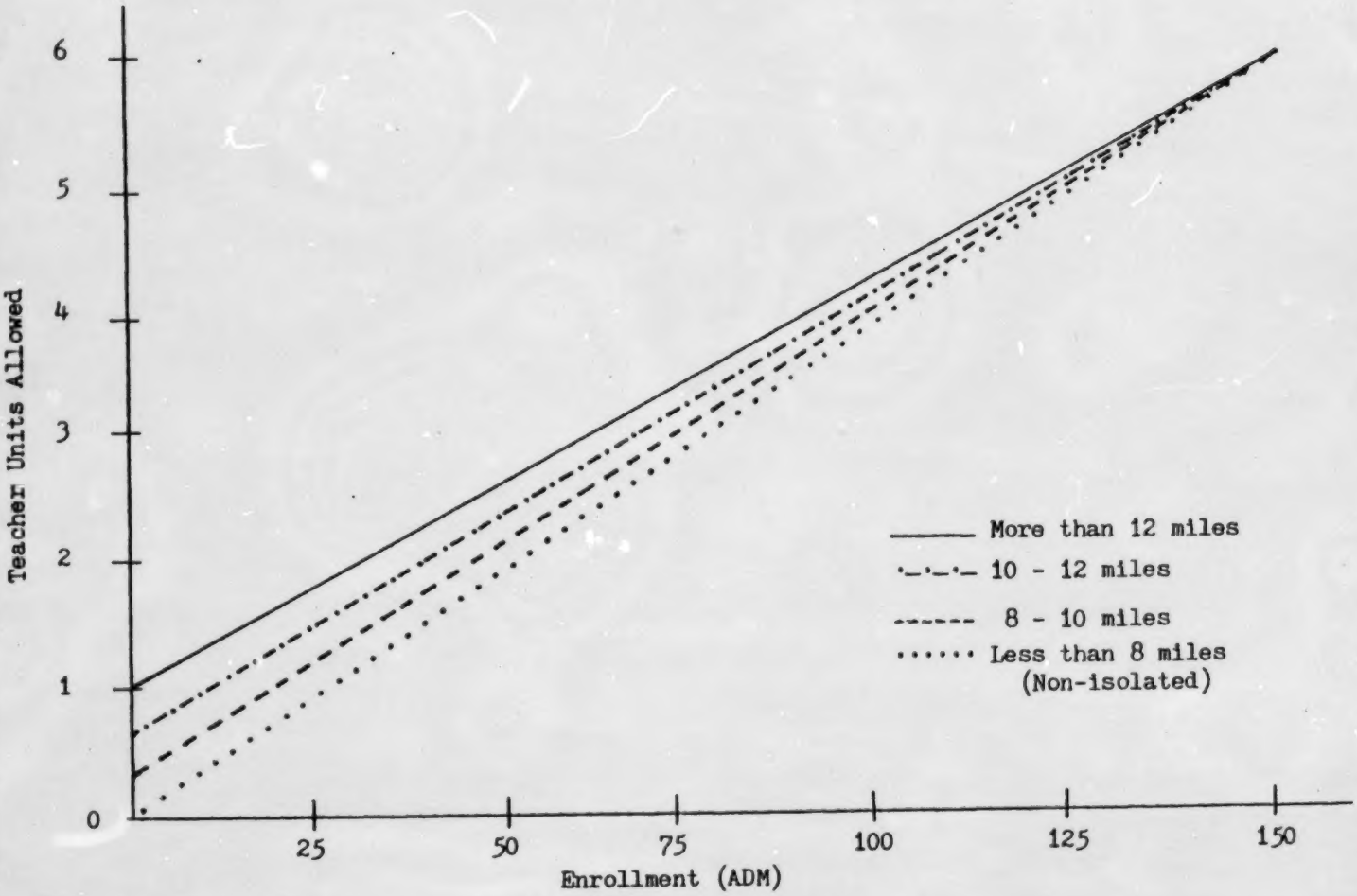

Fig. 6. Teacher units allowed for elementary schools under the proposed geographical isolation factor including proportional entitlements according to the distance to the nearest other school.

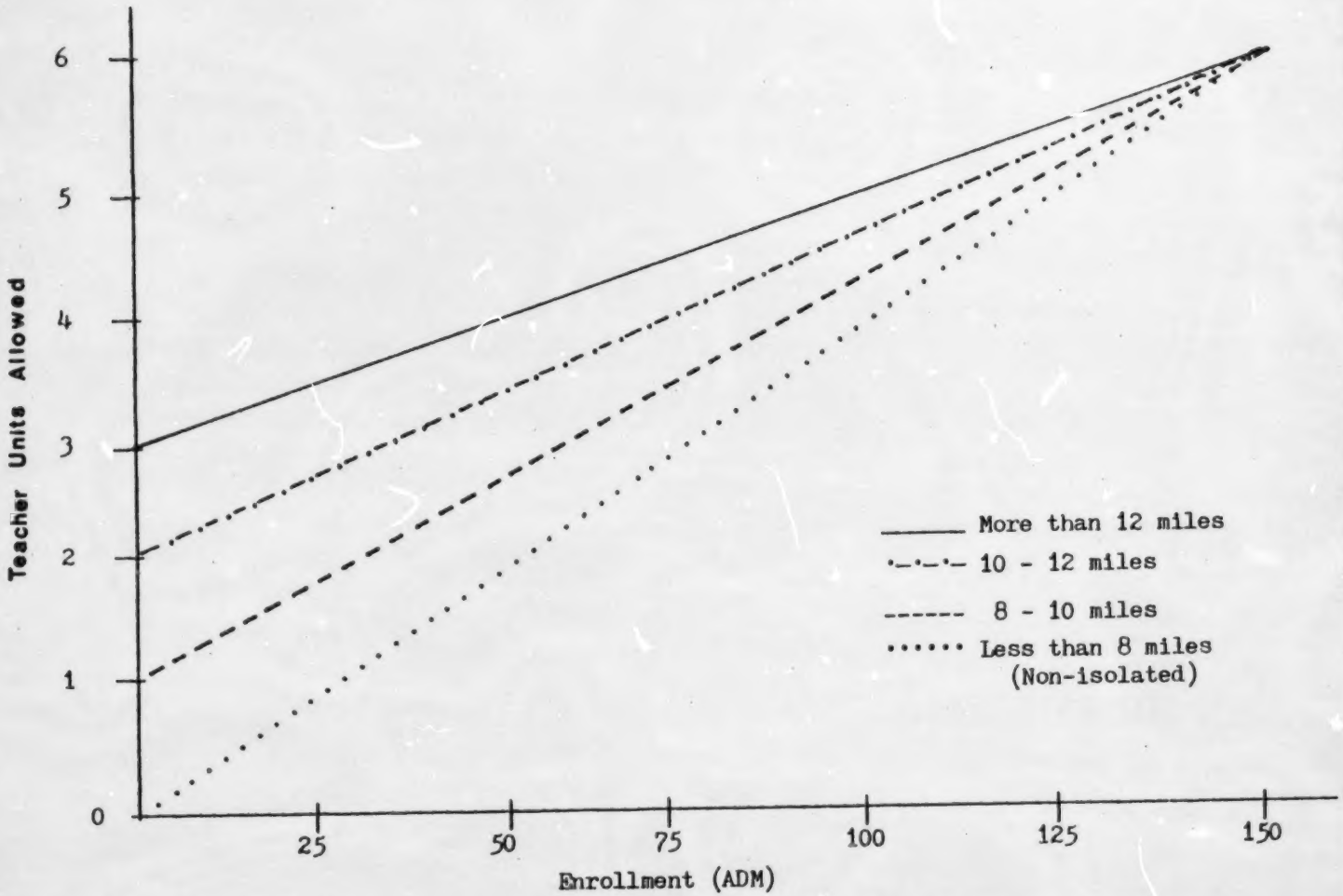

Fig. 7. Teacher units allowed for secondary schools under the proposed geographical isolation factor including proportional entitlements according to the distance to the nearest other school.

The formulas which are shown in Figure 8 are used to calculate the actual entitlements for geographically isolated schools. First, the appropriate formula is used to find the distance factor for either an elementary or a secondary school. This value is then used in the third formula to determine the number of teacher units allowed for the school's revenue entitlement. For example, consider a secondary school which has an enrollment of one hundred students in ADM and which is located nine miles from the nearest other secondary school. The distance factor for this school would be .75. The number of teacher units allowed would then be equal to 4.25 teacher units. A school of the same size that was

$$\text{Distance Factor (DF) for elementary schools} = \frac{\text{Distance} - 8}{4}$$

$$\text{Distance Factor (DF) for secondary schools} = \frac{3\ (\text{Distance} - 8)}{4}$$

$$\text{Teacher units allowed} = \text{DF} + \frac{\text{ADM}\ (6 - \text{DF})}{150}$$

DF = Distance factor

ADM = School enrollment in average daily membership

Distance = Distance to the nearest other school of the same level, measured to the nearest tenth of a mile

Fig. 8. Distance-adjusted formulas for computing teacher units allowed under the proposed geographical isolation factor.

not geographically isolated would be entitled to only 4.00 teacher units while similar schools which are located ten, eleven, and twelve miles, respectively, from the nearest other school would be entitled to 4.50, 4.75, and 5.00 teacher units. As can be seen from this example, the adjustment for distance does provide the "phase-in" which is a desirable attribute of a geographical isolation factor.